

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

INTEROFFICE COMMUNICATION

TO: 2-tert-butoxy ethanol file (CAS # 7580-85-0)

FROM: Gary Butterfield

SUBJECT: Screening level for 2-tert-butoxy ethanol

DATE: March 23, 2006

2-tert-Butoxy ethanol is also known as ethylene glycol t-butyl ether or t-butyl cellosolve. It is a colorless liquid with a molecular weight of 118.17 g/mol. Based on the molecular weight, 1 ppm equals 4.83 mg/m<sup>3</sup>. The boiling point is 152 degrees C. The vapor pressure of this liquid has been reported to be at a value of 1.57 mm Hg at a temperature of 20 degrees C.

The following references or databases were searched to identify data to determine the screening level: U.S. Environmental Protection Agency (EPA) Integrated Risk Information System (IRIS), National Institute for Occupational Safety and Health (NIOSH) Registry for Toxic Effects of Chemical Substances (RTECS), American Conference of Governmental and Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs), Michigan Department of Environmental Quality (DEQ) library, International Agency for Research on Cancer (IARC) Monographs, Chemical Abstract Service (CAS) Online (1968 - March 2006), National Library of Medicine (NLM) - Toxline, and National Toxicology Program (NTP) Status Report.

The March 21, 2006 CAS and NLM on-line literature searches did not find any toxicity data that could be used to establish a screening level. The entry in RTECS identified acute inhalation studies reported by Gage (1970). Review of that study found a series of short-term studies from a one-day to 15 days of exposure. All of the Gage studies were conducted with Alderley Park rats. In the acute experiment, a group of 4 male and 4 female rats were exposed to saturated vapor (2400 ppm or 12 mg/L) for 5 hours. All rats in this study died within two days of the exposure. In the repeated exposures groups of 4 male and 4 female rats were exposed 6 hours a day. The 250 ppm group was exposed for 4 days. These rats exhibited lethargy, hemoglobinuria, and weight loss. The 100, 50 and 20 ppm groups were exposed for 15 exposures – 5 days per week, over three weeks. The 20 ppm (97 mg/m<sup>3</sup>) group had no toxic signs, blood samples were normal and the organs were normal at autopsy. The 50 and 100 ppm rats were normal except for increased red cell osmotic fragility. In these groups there were no toxic signs and autopsy found the organs to be normal. The 50 ppm dose level

can be considered to be the LOAEL as the increased red cell osmotic fragility is considered to be an adverse effect, considering the more severe hemoglobinuria observed at the higher dose. The 20 ppm exposure level is the NOAEL.

The ITSL will be calculated from the R232(1)(d) 7 day equation and the 20 ppm NOAEL as follows. Even though the exposure duration for this study was 15 days, rather than 7 days, it is not considered sufficiently different a time period to modify the uncertainty factor.

$$\text{ITSL} = \frac{97 \text{ mg/m}^3}{35 \times 100} \times \frac{6}{24} = 7 \text{ ug/m}^3 \quad \text{with annual averaging}$$

References:

Gage. 1970. The subacute inhalation toxicity of 109 industrial chemicals. British Journal of Industrial Medicine 27:1-18.

GB:lh